Stainless Steel 316 Flanges

Stainless Steel 316 flanges are high-corrosion-resistant pipe connection components made from chromium-nickel-molybdenum austenitic stainless steel, designed for marine, chemical, and high-chloride environments.

They are widely used where 304 stainless steel may fail due to pitting corrosion.

Why Choose Stainless Steel 316 Over 304?

Key Advantage: Molybdenum Content (2–3%)

The addition of molybdenum significantly improves resistance to:

- Chloride pitting
- Crevice corrosion
- Saltwater exposure
- Acidic chemicals

Chemical Composition of Stainless Steel 316

Standard Reference: ASTM International

Element	Percentage
Chromium (Cr)	16–18%
Nickel (Ni)	10–14%
Molybdenum (Mo)	2–3%
Carbon (C)	≤ 0.08%
Manganese	≤ 2%
Silicon	≤ 0.75%
Phosphorus	≤ 0.045%
Sulfur	≤ 0.03%

Common Grade:
ASTM A182 F316 / F316L

Mechanical & Physical Properties

Mechanical Properties

- Tensile Strength: 515 MPa (min)
- Yield Strength: 205 MPa (min)

- Elongation: 40%
- Hardness: 217 HB (max)

Physical Properties

- Density: 8.0 g/cm³
- Melting Point: 1375–1400°C
- Modulus of Elasticity: 193 GPa
- Thermal Conductivity: 16.3 W/m·K

Types of Stainless Steel 316 Flanges

Semantic Keywords:
SS 316 flanges, ASTM A182 F316 flanges, marine grade flanges, forged stainless steel flanges

1. Weld Neck Flange (WN)

Best for high-pressure and high-temperature systems.

2. Slip-On Flange (SO)

Cost-effective and easy to install.

3. Blind Flange (BL)

Used for pipeline termination.

4. Socket Weld Flange (SW)

Used in small bore high-pressure systems.

5. Threaded Flange

Ideal where welding is restricted.

6. Lap Joint Flange

Used with stub ends for frequent dismantling.

Dimensions & Pressure Ratings

Standards:

- ASME B16.5 (½” to 24”)
- ASME B16.47 (26” to 60”)

Authority: American Society of Mechanical Engineers

Pressure Classes Available:

- 150
- 300
- 600
- 900
- 1500
- 2500

Applications of SS 316 Flanges

Because of superior corrosion resistance, 316 flanges are widely used in:

- Offshore oil & gas platforms
- Shipbuilding
- Desalination plants
- Chemical processing plants
- Pharmaceutical production
- Food processing
- Wastewater treatment

Corrosion Resistance in Chloride Environments

316 stainless steel offers:

- Higher Pitting Resistance Equivalent Number (PREN)
- Better resistance to stress corrosion cracking
- Improved durability in saline conditions

Example:
In coastal installations, 316 flanges last significantly longer than 304 under identical exposure.

Weight Calculation Formula

Approximate Weight Formula:

Weight (kg) ≈ OD^2 × Thickness × 0.0062

For exact weight, refer to ASME B16.5 dimension charts.

Density used: 8.0 g/cm^3

Stainless Steel 316 Flange Price Factors

Commercial buyers must consider:

1. Nickel & molybdenum market rates

2. Flange type
3. Pressure class
4. Surface finish
5. Quantity (bulk discounts)
6. Export packaging
7. Country of origin

Global price range (2026 estimate):
$4–$8 per kg (subject to metal market fluctuation)

How to Select the Right 316 Flange (Buyer Framework)

Step 1: Confirm Application

Marine? Chemical? High temperature?

Step 2: Choose Correct Standard

ASTM A182 F316 or F316L

Step 3: Verify Pressure Rating

Match ASME B16.5 class.

Step 4: Check Certification

Ask for:

- Mill Test Certificate (MTC)
- EN 10204 3.1
- PMI report

Step 5: Confirm Corrosion Requirements

High chloride → 316L recommended

Quality Testing & Inspection

Testing procedures include:

- PMI Testing
- Ultrasonic Testing
- Radiographic Testing
- Hydrostatic Testing
- Hardness Testing

Quality standards reference:
International Organization for Standardization (ISO 9001)

Export Packaging & Documentation

For international orders:

- Wooden box / fumigated crates
- Heat number traceability
- Commercial invoice
- Packing list
- Certificate of Origin
- MTC 3.1

Export buyers should verify compliance with destination country standards.

For More Details

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